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ABSTRACT

The District of Columbia's Nature Computer Camp program, described and evaluated in this paper, was designed to reduce the geographical isolation of economically disadvantaged urban sixth graders, and to provide them with increased knowledge of the environmental and computer sciences. The paper begins by giving details of the program's management, and of the curricula and instructional focus. Next, the program's success in meeting its main objectives is evaluated; it is concluded that the objectives were indeed met. That is, the camp was established and implemented as planned, and following participation in the week-long program, students demonstrated improved social skills and gains in knowledge in the areas of stream ecology, woodland ecology, geology, and computers. Furthermore, at least 80% of the participants maintained or increased a positive attitude toward the program. Eight appendices, which make up more than half of the document, include a schedule of camp events, a sample description of instructional modules, material on a camp scavenger hunt, a description of trails and activities, the evaluation model schema, a sample reporting form, evaluation questionnaires, and data summaries. (CMG)

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COMPUTERS IN THE FOREST: A SUMMER ALTERNATIVE

A DESCRIPTION AND EVALUATION OF THE NATURE COMPUTER CAMP

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INTRODUCTION

Economically disadvantaged students who are residents of large urban areas generally have limited experiences or direct contact with the natural environment. The Nature Computer Camp program, implemented at Camp Round Meadow, on the Catoctin Mountains, was designed to reduce geographical isolation of urban youngsters and to provide them with the opportunity to live and learn through first-hand contact with nature and thereby develop an appreciation of their physical environment and an awareness of environmental problems. In line with the objectives of the District of Columbia Public Schools (DCPS) in regard to computer literacy (DCPS, 1982), the program also sought to develop skills in this area. It also provided students with the opportunity to meet DCPS students from other schools and to improve their social and interpersonal skills.

The specific program objectives were, (1) to increase knowledge in the environmental sciences with particular focus on woodland ecology, stream ecology and geology; (2) to increase knowledge about and skills with computers;

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* The Nature Computer Camp was funded through ECIA Chapter 2 for the 1982/83 School Year. The program operated through the Instructional Services Center of the District of Columbia Public Schools.

(3) to develop a positive attitude towards the program; and (4) to improve social skills.

PROGRAM DESCRIPTION

In the establishment and implementation of the program, the following components applied.

Management

Planning. The management/administrative staff was made up of the Project Manager, Project Coordinator, and Camp Manager, operating out of the Instructional Services Center of the DCPS. All three were involved in planning the program. The duties and responsibilities varied as the program progressed. The Project Manager performed all functions that involved interaction with the central administrative offices. The Coordinator managed the beforehand and in-district aspects of the program such as curriculum preparation, student selection and scheduling. The Camp Manager who stayed on camp throughout the program was responsible for the daily organization and management of the program. All three were involved as follows: disseminated information about the camp; determined enrollment procedures and provided registration and physical evaluation forms to principals as requested; reviewed and revised or updated all instructional/ curriculum materials previously used at Camp Round Meadow, the parent camp from which the NCC program evolved; developed the schedule for the six one-week sessions, scheduled selected participants and notifed them of dates of attendance; determined needed materials and supplies and ordered materials as needed, or borrowed them as in the case of computers; approved or sought approval of cooperative agreement and lease with the U.S. National Park Service for use of the camp facilities, and food service

contract with vendors; arranged for bus service for transportation to and from the camp as well as within the camp; and approved the design for the evaluation of the program.

Staff selection and development. The instructional staff was made up of five teachers and nine aides. The teachers had qualifications in the specialty areas of the program. The aides were graduate and undergraduate students who have had experience working with children. One of the aides was a special education aide. Aides performed counseling duties and monitored student socio-emotional adjustment. Teachers and aides attended a three-day workshop prior to the opening of camp. The workshop was conducted by the administrative staff.

Scheduling. The program was scheduled to operate for six weeks during the summer, from June through August. There were six sessions, each one lasting for five days. On a daily basis activities were scheduled from 7:00 a.m. through 9:00 p.m.. The schedule of activities on Monday and Friday, the days of departure to and from camp have slight variations. (See sample, Appendix A).

Materials and supplies. Besides the materials needed for the study of environmental science such as measurement instruments, the program used twenty computers which were borrowed from the Junior High School Science Computer Program, buses to carry participants to and from to camp, and buses for in-camp transportation to the various nature trails.

Students. The majority of the students were sixth grade students who completed the sixth grade curriculum, who received parental consent to participate and who had health insurance coverage. A limited number of special education students (less than ten per week) were also participants.

Grouping. For each session there was an average of eighty students. Students were randomly placed into one of four groups the names of which reflect the dual purpose of the program. The groups were Micro Chips, Trailblazers, Backpackers, and Loopers. Each group operated as a unit in participating in the various planned activities.

Curriculum and Instruction

Academic curriculum. The environmental science curriculum was focussed on woodland ecology, stream ecology and geology. There was focus both on content as well as on the processes of scientific inquiry to include the application of measurement principles in data collection, problem solving techniques during investigation, organizing, classifying, recording and interpreting data and making abstractions, inferences and conclusions. (See Sample Instructional Module in Appendix B).

In the computer science curriculum students received information on the history of computers, learned to write a simple program, identified the hardware components that make up a computer, participated in discussions involving the impact of computers on society, computer-related careers and the effect of computers on careers (Appendix B).

Recreational curriculum: Students selected extra-curricula activities in various areas of interest to include athletic contests, talent shows, scavenger hunts or special work projects. Other activities included arts and crafts where students did tie-dying, wall murals, banners and posters. In the conduct of these activities, extensive effort was directed at integrating the curriculum in environmental science and computers in all the recreational activities. The activities noted in Appendix C for the scavenger hunt provide an example.

Socio-emotional Curriculum: In "rap sessions", counselors held

discussions with students on expected social behaviors and interpersonal relations. Personal problems were also discussed with the objective of increasing socio-emotional maturity, adjustment, social skills, and the development of a positive attitude towards the program. The development of the latter was also promoted by teachers as they sought to present their materials in a varied and interesting fashion and to establish an amicable relationship with the students.

Students were engaged in a schedule of shared work in cleaning up their dormitories and the cafeteria. In so doing, they acquired management skills as they supervised clean-up activities. This schedule of shared work provided a socialization experience which is difficult to measure but was considered a valuable outcome of the Nature-Computer Camp Program.

Instruction. The focus of instruction in environmental science was on the reinforcement of the knowledge, skills and competencies acquired in the sixth grade and on actual hands-on experiences. The major part of the instruction occured on the trails. Students spent an average of three hours a day on the trails.

In the computer sessions, lectures and hands-on experiences prevailed. The computer sessions were held indoors. Instruction was individualized according to student level and pace of learning.

PROGRAM EVALUATION

Purpose

The purpose of the study was to determine the degree to which the Nature Computer Camp program was able to achieve its stated program objectives. For this evaluation four program objectives were identified:

OBJECTIVE A: By July, 1983, a Nature-Computer Camp combining science and computer skills for the District of Columbia Public School sixth graders, will be established at Camp Round Meadow, Thurmont, MD.

OBJECTIVE B: At the completion of the week in the Nature-Computer Camp program, participants will demonstrate a significant gain in knowledge in the areas of stream ecology, woodland ecology and geology, and in knowledge about computers.

OBJECTIVE C: At the completion of the week in the Nature-Computer Camp Program, at least 80% of the participants will show maintenance or an increase of a positive attitude toward the program.

OBJECTIVE D: Using a set of social expectations established by the staff and student campers, campers will demonstrate appropriate socialization.

Evaluation Objective

The evaluation objective was to determine whether program inputs, processes and outcomes for the four objectives of the program occured as intended via an analysis of the congruency between intended and observed factors, thus measuring whether or not objectives were met.

Evaluation Design

The Planning, Monitoring and Implementing (PMI) Evaluation Model was used for the study (Ford, 1981; McBeath and Bland, 1983). This model was designed by the Division of Quality Assurance, District of Columbia Public Schools using as a frame of conceptualization Stake's data identification model described in "The Countenance of Educational Evaluation" (1976) and the Discrepancy Evaluation Model of Provus (1981). As structured, the PMI model provides for both formative and summative evaluation. Thus it serves to provide information for program improvement in the process of implementation, (and thereafter) and program effectiveness in attaining its specified outcomes.

Information is provided with respect to three contingency factors - inputs, processes and outcomes. Inputs refer to conditions or resources existing prior to the implementation of the program. Examples include budget allocations, persons served, number of persons in the program which promote effective implementation of the program activities and the attainment of program outcomes. Processes are the activities that will lead to the outcomes. Outcomes comprise the third and final piece of evaluation information. They define the products specified in the objectives in specific and if possible, behavioral terms. They could include student terminal behaviors or tangible products such as a report of proposal or intangibles, such as the establishment of a program.

The evaluation of inputs, processes and outcomes is conducted within a discrepancy frame whereby intended aspects are analysed for their congruency relative to observed factors. The "intended" aspects indicate the kinds of information on inputs, processes and outcomes, that one expects. When the expectations of a program have been identified and delineated according to the requirement of the model, a program plan has been established. The "observed" refers to the information identified and delineated subsequent to physical observations of behaviors, material resources and activities as specified in the program plan.

The analysis of the congruency between intended and observed information leads to the determination of agreement or discrepancy for identified features on inputs, processes and outcomes.

Besides the analysis of congruency, the model also allows for the analysis of the contingency between inputs, processes and outcomes. Applying judgement to the relationship among these three factors provides insight to

the evidence delineated relative to the outcomes. Appendix E provides a schemata of the model.

Finally, the model turns our attention to decision-making, which is the key term in the PMI definition of evaluation. There are a multiplicity of decisions which can be made. Decisions to revise, continue or terminate part or the toatl program or operation can result from the systematic process of data collection which the model requires.

A specific reporting format has been devised to accompany the model. A sample of the format with specific data on inputs, processes and outcomes acquired from the evaluation of one of the objectives of this program are included in Appendix F.

It should be noted that the information reported in this study is summative. A formative evaluation was conducted by the ECIA Chapter 2 Evaluation Unit of the Division of Quality Asurance, DCPS, at the mid point of program implementation delineating information relative to the inputs and processes for the four objectives. The evidence revealed agreement for all factors except for two (materials and aides) which did not adversely affect operations (DCPS, 1983). A second point to note is that the analysis in this study is focused on congruency and not contingency evaluation. Logical contingency analysis was a major component in the design of the program plan. A high logical relationship among inputs, processes and outcomes was established.

EVALUATION RESULTS

In presenting the findings, the program objectives are restated and the findings for inputs, processes and outcomes are delineated systematically.

OBJECTIVE A: By July, 1983, a Nature-Computer Camp combining science and computer skills for the District of Columbia Public School sixth

graders, will be established at Camp Round Meadow, Thurmont, MD.

Inputs. Fourteen inputs were identified as necessary for the attainment of the objective. Twelve of these inputs were in place and acquired an agreement status on the evaluation design for project staff (i.e. Project Manager and Coordinator, Camp Manager and Teachers), support personnel such as elementary school contact persons, pre-enrollment of 80 regular students and 10 special education students for each of the six sessions of the program, a schedule of six one-week sessions, registration forms, physical evaluation forms, staff development evaluation instrument and camp area and facilities. Discrepancies were observed for the inputs of nine aides and adequate planning supplies and materials. There were seven aides and one special education aide. Camp personnel reported that the project ran well with the eight aides. The materials were ordered but were not delivered in a timely fashion. This tardiness interfered very little with the operation of the camp since the project staff showed initiative and creativity in the development of needed materials.

Processes. There was agreement for all nineteen processes identified as essential in the establishment and implementation of the program. The project staff obtained approval for the cooperative agreement and lease with the U.S. National Park Service for use of the camp and facilities and requested this department to make arrangements for the transportation of the students. The project staff also approved the food service contract with vendors, ordered supplies and materials, reviewed and updated curricula materials. The coordinator and staff also prepared and distributed registration forms and physical evaluation forms. Dissemination of literature to parents about the program was done through principals. With the help of a contact person at the

school, the principal identified eligible students based on the results of physical examination, the availability of health insurance and the successful completion of the sixth grade curriculum. These students were notified of dates of attendance and were scheduled by the program staff.

Prior to camp opening, a three-day workshop was held for teachers and aides. At the end of the workshop, participants completed an evaluation form. Project staff kept records of attendance and activities. Project teachers taught classes in geology, woodland ecology, stream ecology, and computers. They also administered tests and questionnaires. Aides performed counseling duties.

Outcomes. Three outcomes specified were, (1) that the general administrative duties and planning necessary for establishing the program was accomplished; (2) that the program was in operation for six five-day sessions and (3) that 90% of teachers will rate the staff development training in a positive manner. There was complete agreement bewteen the observed and intended outcomes. The records submitted showed that the general administrative duties and planning necessary for establishing the Nature Computer Camp were accomplished and that the NCC was in operation for six five-day sessions. Analysis of the responses of staff members to the questionnaire revealed that 97% of the teachers rated the training as highly positive on five selected criteria.

OBJECTIVE B: At the completion of the week in the Nature-Computer Camp program, participants will demonstrate a significant gain in knowledge in the areas of stream ecology, woodland ecology and geology, and in knowledge about computers.

Inputs. This objective required the same set of inputs as the previous one with the addition of five other inputs. Required for the implementation

of the instructional component of the program were curricula for the four content areas identified, a program-designed test to measure knowledge of computers and of the three environmental science areas, twenty computers, an in-camp bus for transportation and three environmental trails. There was agreement for all of these inputs. (Appendix B provides sample curricula modules developed for content areas.) The twenty computers were borrowed from the Junior High School Computer Literacy program. The in-camp bus was provided by the DCPS. The Camp Manager and one other male instructor obtained licenses to operate the bus.

Processes. The instructional processes included lectures and discussion in the four content areas. Under the instruction and supervision of teachers, students applied the principles of scientific inquiry to include the application of measurement principles in data collection, problem solving techniques, identification, organization and classification of objects. Students also recorded and interpreted data. They made abstractions and inferences and drew conclusions from evidence provided. A substantial amount of these activities occurred on the three trails - Hog Rock Trail, Owens' Creek Trail and Wolf Rock Trail. (See Appendix D for Description of Trails and Activities.) Students wrote computer programs, identified hardware components that make up a computer, read about or participated in discussions on the impact of computers on society, discussed computer-related careers, and received information on the history of computers and computing devices. Students completed both pre- and posttests on the three environmental science subtests and the computer subtest of the Nature Computer Camp Knowledge Test.

Outcomes. The outcomes were that students will show a statistically significant increase in knowledge about environmental science and computers. In each of the three environmental areas and in computers, the expectation was that gains would be made in the following ability areas:

Stream ecology: to clasify aquatic organisms, indicate life cycles of various organisms and infer interdependent relationships in a stream environment.

Woodland ecology: To indicate interdependent relationships existing in a forest community and classify the organisms therein as producers, consumers and decomposers.

Geology: To identify rocks, minerals and soil, classify examples of each group and identify evidence of erosion and weathering.

Computers: To identify and describe the various parts of the computer and the role of computers in the future.

There was agreement between the intended and observed items for both outcomes. A t test analysis of the data for the environmental science test on the three areas revealed signficant gains ($N = 336$, $t = 10.9$, $p < .001$). Separate analyses on the pre and posttest scores on the three subareas consistently showed significant increases in knowledge in stream ecology ($N = 336$, $t = 9.13$, $p < .001$), in woodland ecology ($N = 336$, $t = 6.15$, $p < .001$), and geology ($N = 336$, $t = 7.67$, $p < .001$). The analyse of the pre- and postest data on the computer test revealed significant gains in computer skills ($N = 336$, $t = 7.48$, $p < .001$). (Table 1 in Appendix H provides the data summary.)

OBJECTIVE C: At the completion of the week in the Nature-Computer Camp Program, at least 80% of the participants will show maintenance or an increase of a positive attitude toward the program.

Inputs. The inputs for this objective were also the same as for Objective A. There was, however, one addition - a pre- and posttest attitude scale designed with the assistance of the ECIA Chapter 2 Evaluation Unit. (See

Appendix G.) As in the previous objective, discrepancies in the materials and aides did not hamper the attainment of this objective.

Processes. The processes that were introduced in the attempt to increase or develop a positive attitude in students towards the program included the following: the establishment of rapport and the maintenance of a cordial relationship between staff and students; exposure to a wide variety of science and computer experiences with different staff members; instruction at the level and speed of learning of the students, the presentation of subject matter in an enjoyable and interesting way; extra-curricula recreation activities selected by students. For the assessment of attitude, students completed the attitude scale on a pre-posttest schedule. All these processes were observed to be as intended.

Outcomes. For the outcome of the objective, the expectation was that 80% of the students attending camp for a week would show maintenance or an increase of a positive attitude toward the program. Analysis of the responses of students to the Nature Computer Camp Attitude Scale was on the basis of a pre-posttest design using the sign test. The analysis revealed that 98.5% of the students showed an increase of a positive attitude towards the program and that the increase was statistically significant ($N = 336$, $z = 17.7$, $p < .001$).

OBJECTIVE D: Using a set of social expectations established by the staff and student campers, campers will demonstrate appropriate socialization.

Inputs. Three new inputs were added for this objective in addition to those listed for Objective A. The new inputs were (1) the definition of a well socialized individual, (2) a list of expected social behaviors, and (3) a Counselor Checklist. Intended and observed inputs were in agreement.

Processes. There were no discrepancies between the intended and observed processes. All items were in agreement. Aides held "rap sessions" with the students. At the first session, aides provided students with the definition of a well socialized individual. Students and aides worked together to establish a list of expected social behaviors and to enforce these behaviors. Follow-up rap sessions examined problems encountered in camp and interpersonal relationships and interdependence. All camp students were involved in cooperative activities such as KP duty, dorm clean-up and inspection, camp clean-up and inspection, and a scavenger hunt. At the end of each of the six sessions, the counselors completed the individual student socialization checklist (Appendix G). This was done on Friday during the first session and on Thursdays during the proceeding sessions. The change of day from Friday to Thursday was necessitated by the need to complete the Compuscan Answer Sheets used by both counselors and teachers.

Outcome. The outcome for objective D stated that the mean score on the counselor checklist on socialization would be 70% or better for students attending camp for a week. Analysis of the ratings of 332 students showed a mean score of 85%, thus exceeding expectations (Table 2, Appendix H).

CONCLUSION AND RECOMMENDATION

With the exception of two inputs (i.e. aides and materials), all other inputs and the processes and outcomes specified for the objectives of the program were observed to be in agreement with the intended. The inputs for which a discrepancy evaluation occured did not affect the progress of the program. Thus, the program was successful in meeting all four objectives.

The Nature-Computer program is very significant for the stimulating way it presents materials in science and technology. It places these areas in a context that is different from the regular classroom. It integrates science and technology into everyday events thereby making them subjects that can be mastered and controlled. In so doing, the program responds to the national acclaim to motivate and increase students, and specially minority students participation in these areas (Johnson and Prom, 1983).

The selection of sixth grade students is especially important in meeting this demand. Documented evidence reveals that grade schools hold the key to encouraging minority entry into the science/technology areas. Efforts directed at increasing minority participation in science, mathematics and technology areas should precede the high school years. Building a solid foundation in the areas, equipping students with the competences needed for successful participation, the development of a reality perspective about the areas, and building interest in these fields at an early age are all material.

During the year of implementation, i.e. 1982/83 School Year, the program was funded by ECIA Chapter 2 funds. The DCPS is currently making a decision to retain the program under the regular budget and to have it operational year round.

REFERENCES

District of Columbia Public Schools. Computer Literacy Five Year Plan, SY 1983-87. Vol. 1. Division of Planning and Program Development Washington, D.C., 1982.

District of Columbia Public Schools. The Nature-Computer Camp: Interim Evaluation Report, 1983. Division of Quality Assurance. Washington D.C., 1983.

District of Columbia Public Schools. The Nature-Computer Camp. Final Evaluation Report, December 1983. Division of Quality Assurance. Washington, D.C., 1983.

Ford, V. "Description and Rationale for the Planning, Monitoring and Implementing (PMI) Model. Presentation was part of a symposium, "The Development of an Evaluation Model for a Public School System and applications at Different Levels; APA Annual Meeting, Los Angeles, CA, April, 1981.

Johnson, S. and Prom, S. Factor Related to Science and Mathematics Career Choice: A Survey of Alumni of A Better Chance, Inc. Final Report Submitted to the Ford Foundation. December 1983.

McBeath, M. and Bland, J. "Program Evaluation Using the PMI Model" Manual for PMI Evaluation Workshop, APA Annual Meeting, Anaheim, CA, August, 1983.

Provus, M. Discrepancy Evaluation, Berkely, CA.; McCutchan, 1981

Stake, R. The countenance of educational evaluation. Teachers College Record, LXVIII, 1976, 523-540.

APPENDICES

APPENDIXES

A. Nature-Computer Camp - Sample Schedule of events

B. Sample Description of Instructional Modules

C. Nature-Computer Camp - Scavenger Hunt

D. Description of Trails and Activities

E. Evaluation Model Schema

F. Sample Reporting Form (excepted from ECIA Chapter 2 Project - The Nature-Computer Camp Final Evaluation Report)

G. Questionnaires

H. Data Summaries

APPENDIX A

NATURE-COMPUTER CAMP
SAMPLE SCHEDULE OF EVENTS

TUESDAY

7:00 - Wakeup

7:30 - KP's to cafeteria
Aerobics (All Staff)

7:45 - Breakfast(family style) all groups and staff

8:30 - 8:50 - cleaning dorms - counselors

9:00 - 12:00 - Classes (all groups)

Loopers - Stream Ecology (Ted & Jan)
Backpackers - Woodland Ecology (Sarah & Eric)
Trailblazers - Computers (Veronica & Davin)
Micro-Chips - Computers (Lawrence & Kimberly)

12:00 - 12:45 - Lunch (cafeteria style)

12:00 - 1:00 - free time

1:00 - 4:00 Classes (all groups)
Loopers - Computers (Veronica & Rod)
Backpackers - Computers (Lawrence & Robin)
Trailblazers - Geology (Thomas & Lisa)
Micro-Chips - Woodland Ecology (Sarah & Kevin)

4:15 - 5:10 - Extracurricular Activities (all groups with their counselors)

5:15 - KP's to cafeteria

5:30 - Dinner (family style) (all groups)

6:30 - 7:25 - Nature Scavenger Hunt (all groups)
Trailblazers - (Ted & Lisa & Davin)
Backpackers - (Thomas & Robin & Eric)
Loopers - (Mary & Jan & Rod)
Micro-Chips - (Sarah - Kim & Kevin)

7:30 - 8:30 - Computer Practice - Loopers and Backpackers (Ted, Robin & Eric & Jan & Davin)

8:35 - 9:35 - Computer Practice - Micro-Chips and Trailblazers (Mary, Davin & Lisa & Kim & Kevin)
Nature Bingo - Loopers & Backpackers (Lawrence, Janis & Robin & Eric & Rod)

9:35 - Preparation for bed

10:15 - Lights Out

APPENDIX B

SAMPLE DESCRIPTIONS OF INSTRUCTIONAL MODULES
A. GEOLOGY
B. COMPUTER LITERACY

Terminal Objective

At the completion of a week in the Summer Science Camp Program, participants will demonstrate a significant gain in knowledge in the area of geology.

Enabling Objective 1

Given instruction, the student will be able to classify rocks as igneous, sedimentary or metamorphic.

Instructional Activities

A. Provided with an "Identification Chart of Major Specimens", and rock samples, the student will classify each sample as igneous, sedimentary or metamorphic.
B. Using rocks collected on the trail, the student will properly classify each by comparing his/her rock sample with identified samples provided by the teacher.

Enabling Objective 2

Given instruction, the student will be able to describe at least three characteristics of rocks and minerals.

Instructional Activities

A. Using a rock hammer, the teacher will break at least three different samples of rocks and minerals and describe the characteristics of each.
B. Given samples of three different rocks and minerals, the student will describe at least three characteristics of each rock and mineral.

Enabling Objective 3

Given instruction, the student will be able to describe orally three characteristics that make soil different.

Instructional Activities

A. The student will collect two different soil samples from two different locations and communicate orally three characteristics that make soil different.
B. The teacher will assist the student in measuring the reaction or pH of different soils and test for essential plant nutrients.

Enabling Objective 4

Given instruction, the student will be able to identify and describe some evidences of weathering and erosion.

Instructional Activities

A. The teacher will point out and discuss with students observable evidence of weathering and erosion along the trail.

B. The student will identify evidences of weathering and erosion and describe the observable characteristics of each.

Enabling objective 5

Given instruction, the student will be able to use a compass to locate different directions.

Instructional Activities

A. The teacher will explain how to use the compass to locate different directions.

B. The student will use a compass to locate the direction of different landmarks.

Enabling Objective 6

The student will be able to describe and infer some evidence of the earth undergoing constant change.

Instructional Activities

A. The teacher will discuss with the student, describe and infer evidence of the earth undergoing constant change.

B. The student will describe and infer evidence of past and present happenings that indicate that the earth is undergoing constant change.

Computer Literacy

Objective: At the completion of a week in the Summer Science Camp Program, participants will demonstrate a significant gain in knowledge about computers.

Activities

I. Set-up computer: Demonstration by instructor which includes which includes connecting power unit to console, attaching switch box which controls output (TV or Computer), connecting switch box to console, attaching recorder to console; demonstration of how to turn computer on and off at this time.

II. During orientation students will discuss careers and the history of Computers using the latest movies and television programs, and receipts which give the students insight as to the impact of computers in our society. Information concerning report cards, bank transactions, bills (telephone, gas and electric) and grocery purchases, reveals to the students how their lives and future will be affected.

III. A hand-out is given to the students in which the components and functions of the Atari Computer are identified and explained.

IV. Students will be given the following assignments which introduce them to Atari Graphics and Programming: a) plot points on the Video Display Sheet; this will enable each student to plot these points on the CRT and write the program for this activity; b) Plot the term ATARI on the Video Display Sheet and the CRT.

V. Plot and write program for a rectangle.

VI. After the students have successfully attained the skills mentioned previously, they will be introduced to the Creative Mode which enables the students to create their own Atari Graphics and write their own programs (Ex: design rockets, buildings, airplanes, their names).

APPENDIX C

NATURE-COMPUTER CAMP - SCAVENGER HUNT

Nature Computer Camp
Scavenger Hunt

Find the Following:

1. A rock shaped like a diamond (2pts)
2. A twig with opposite notches (5pts)
3. Something not natural (2pts)
4. A leaf with pointed edges (2pts)
5. Something needed to live (3pts)
6. A seed (2pts)
7. Something interesting (2pts)
8. A warm round fuzzy (3pts)
9. A dead leaf with U-shaped lobes (5pts)
10. A twig with alternate notches (5pts)
11. Something old (2pts)
12. Something that does not belong (3pts)
13. Describe an object that you saw that produces pollen (3pts)
14. Something old and yellow (2pts)
15. There are more ? trees in front of dogwood lodge (5pts)
16. A shiny object (2pts)
17. A rock made of more than one material (2pts)
18. An object that reminds you of a CRT (5pts)
19. A dead leaf with V-shaped lobes (5pts)
20. Some that is unusual (be able to explain why) (5pts)

HAVE FUN AND USE YOUR IMAGINATION

BEST COPY AVAILABLE

APPENDIX D

DESCRIPTION OF TRAILS AND ACTIVITIES

DESCRIPTION OF TRAILS AND ACTIVITIES

During the course of a week at the Nature-Computer Camp, each student participates in approximately 18 hours of academic investigation of three predominant apects of the environment. The areas investigated are (a) Woodland Ecology, (b) Stream Ecology and (c) Geology. Student are involved in one area of study per day which includes both trail and classroom activities. About $2\frac{1}{2}$ hours are spent investigating a prescribed trail on which basic concepts are developed in a natural setting. The remaining $2\text{-}2\frac{1}{2}$ hours are utilized in a classroom setting where follow-up activities are provided that require the application of basic concepts taught on the trail.

The following is a brief description of the sites utilized in Catoctin Mountain Area and the basic concepts developed at each site.

Wolf Rock Trail

The Wolf Rock Trail is a 3 mile excursion that takes the students to the Thurmont Vista and Wolf Rock Overlook. At Thurmont Vista, the students are able to view the Maryland and Pennsylvania countryside for a distance of forty miles to the east and northeast. During the excursion, the students investigate the natural geological processes which went into the formation of the mountain and its features. They observe evidences of those forces of nature which are constantly eroding, forming, the reshaping the mountain. They describe how different rock types on the trail were formed, and locate rocks containing iron one. They discuss mining and the role it played in the population growth of the area. They also discuss briefly the history of the Indians who lived in Maryland before 1608 even though very little evidence of their presence remains.

Owens' Creek Trail

Owens' Creek, which is located about one half mile from the camp, is one of the sites for stream ecology investigations. The hike from the school to the site involves the students in (a) the investigation of a spring, (b) the identification of some trees and other plants along the trail, (c) the observation of a stone wall built by early settlers, and (d) the exploration of pits which were formerly coal excavation sites. At the creek, the students investigate the interacting components (green plants, animals, decomposers, etc.) of a stream community. They collect specimens and group them according to structure. They investigate the conditions of the stream, and discuss how the conditions may affect the populations within. They test water samples and interpret the resulting data.

Hog Rock Trail

The Hog Rock Trail takes the students about $1\frac{1}{2}$ miles through an eastern hardwood forest community to Cunningham Falls. Along this trail, the students investigate interrelationships/interdependencies of living and non-living things. The trail activities include (a) identifying different populations that inhabit a forest community and citing examples of how the different populations depend on each other, (b) citing examples of how plant and animal needs are met in a forest community, (c) identifying several different tree types and describing ways in which man has made use of each, and (d) observing evidences of erosion and made-made attempts to slow it down. At Cunningham Falls, the students explore and investigate a waterfall and the area surrounding it.

APPENDIX E

EVALUATION MODEL SCHEMA

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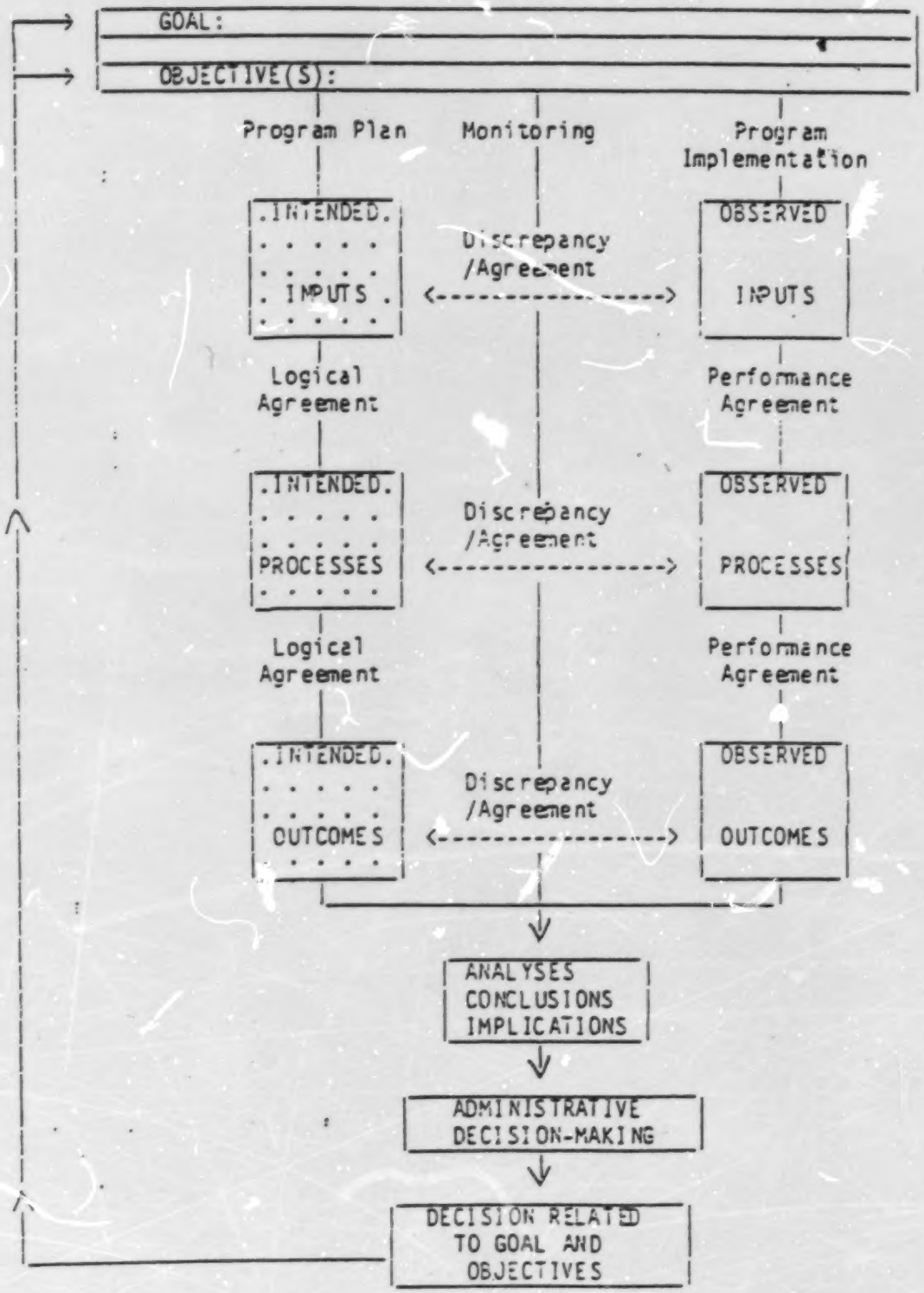
EVALUATION MODEL SCHEMA



APPENDIX F.

Sample Reporting Form

(excerpted from ECIA
Chapter 2 Project - The Nature-Computer
Camp Final Evaluation Report)

FINAL REPORT

PLANNING, MONITORING, AND IMPLEMENTING (PMI)
EVALUATION MODEL FOR DECISION-MAKING

Reporting Form

Goal: The Nature-Computer (Summer Science) Camp program will provide the opportunity for the student camper to develop socio-academic skills emphasizing environmental inter-dependencies and computer literacy.

Objective B: At the completion of the week in the Nature-Computer Camp Program participants will demonstrate a significant gain in knowledge in the areas of stream ecology, woodland ecology and geology and in knowledge about computers.

PART I

INPUTS

INTENDED	STATUS	OBSERVED
- Project Coordinator	Agreement	- The evaluation team met with the project coordinator.
- Camp Manager	Agreement	- A meeting was held with the camp manager. He was also observed in operation.
- Six summer camp staff members	Agreememt	- The camp manager reported that there were six teachers. The team met five of the teachers and observed four teaching.
- Nine Aides	Discrepancy	- There were seven aides and one special education aide. Camp personnel reported that the project operated adquately with eight aides.
- Pre-enrollment of 80 regular students per week	Agreement	- There was pre-enrollment of 80 regular students per week. Less than this number attended per week.
- Pre-enrollment of 10 special education students per week	Agreement	- There was pre-enrollment of 10 special education students per week. Less than this number attended per week.

OBJECTIVE B

PART I (continued)

INPUTS

INTENDED	STATUS	OBSERVED
- Schedule for six one-week sessions	Agreement	- A schedule for the six one-week sessions was provided to the evaluation team.
- Curricula for four content areas	Agreement	- Curricula for the four content areas were provided to the respective teachers.
- Program-designed test to measure knowledge of computers and of three areas of science.	Agreement	- Program-designed test measuring knowledge of the four content areas was revised by the Evaluation Unit.
- 20 computers	Agreement	- Twenty (20) computers were borrowed from the Junior High Science Computer Program. The computers were observed being used.
- Adequate materials and supplies	Discrepancy	- Materials and supplies provided by the project were not adequate. However, teachers and counselors were creative in finding substitutes.
- In-camp bus transportation	Agreement	- The in-camp bus was observed transporting the participants. When it was realized that DCPS bus drivers were not available, staff acquired bus driver licenses to operate the bus.
- Three trails - Wolf Rock Trail, Hog Rock Trail and Owens' Creek Trail.	Agreement	- Three trails were available. Participants were observed starting out on the Hog Rock Trail.

OBJECTIVE B

PART II

PROCESSES †

INTENDED	STATUS	OBSERVED
1a. Under the instruction or supervision and guidance of staff members, students will apply the following processes in each of the areas of the science component of the program: - apply measuring skills and problem solving techniques during investigation; - locate, organize, classify, record and interpret data; - make abstractions and inferences; - make observations, measure and collect data during the hikes.	Agreement	1a. Observations of teachers during instructional time revealed the application of the principles of scientific inquiry. Reports made by the geology teacher and observations made by the evaluation team indicated that he began his classes on the geology trail with a lecture on rocks, their classification and characteristics, minerals and their properties and three soil types. The actual identification, analysis and collection of the various rocks occured during the hike through the trail. Also during this time, students observed the soil at various places and discussed weathering and erosion and the interdependence between animals and plants. Making abstractions and inferences and drawing conclusions from observed data were all conducted on the trail. Among the instruments used was a compass to locate specific objects and for travelling to and from specific points on the geology trail.
2a. Students will participate in classroom activities designed to help them acquire computer literacy as follows:	Agreement	2a. Objectives listed in the computer rooms indicated participation in activities designed for the acquisition of computer literacy such as writing a simple program

† Processes are numbered to correspond with outcomes

OBJECTIVE B

PART II (continued)

PROCESSES †

INTENDED	STATUS	OBSERVED
writing a simple program that works (using Atari graphics); identifying the hardware components that make up a computer; participating in discussions involving the impact computers have, are having, and will have on society; discussing computer related careers and how computers will affect each type of career; receiving information on history of computers and computing devices.		that works (using Atari graphics), identifying the hardware components that make up a computer, participating in discussions involving the impact computers have, are having, and will have on society, discussing computer related careers and how computers will affect each type of career, receiving information on history of computers and computing devices. Evidence of involvement in these activities was found in student scrapbooks, in the types of displays on the walls and in the books made available.
b. Students will take the NCC Knowledge Test.	Agreement	b. All students were tested twice on the NCC Knowledge Test as evidenced by the pre- and posttest data submitted to the ECIA Chapter 2 Evaluation Unit.

† Processes numbered to correspond with outcomes

OBJECTIVE B

PART III

OUTCOMES

INTENDED	STATUS	OBSERVED
1. Analysis of the pre- and posttest scores on the program-designed science test will show a significant increase in the ability to: - classify aquatic organisms, indicate life cycles of various organisms and infer interdependent relationships in a stream environment; - indicate interdependent relationships existing in a forest community and classify the organisms therein as producers, consumers or decomposers; - identify rocks, minerals and soil, classify examples of each group and identify evidence of erosion and weathering.	Agreement	1. Separate analyses of the pre- and posttest scores on the three subtests of the environmental science test showed significant increases in knowledge gained in stream ecology ($N = 336$, $t = 9.13$, $p < .001$), woodland ecology ($N = 336$, $t = 6.15$, $p < .001$) and geology ($N = 336$, $t = 7.76$, $p < .001$). (See Appendix D).
2. Analysis of the pre- and posttest scores on the program-designed computer test will show a significant incease in knowledge about computers.	Agreement	2. Analysis of the pre- and posttest scores on the computer test showed a significant increase in knowledge about computers ($N = 336$, $t = 10.91$, $p < .001$). (See Appendix D).

APPENDIX G

QUESTIONNAIRES

Nature-Computer Camp
Attitude Scale for Campers

Name _____ School _____

Date _____ Age _____

Grade _____ Sex: Boy or Girl (circle one)

Direction: We would like to know your feelings about the natural environment, computers and living with others. Please read each statement and indicate with a checkmark ( ) whether you agree a lot, agree a little, are undecided, disagree a lot or disagree a little.

It is fun to:	Agree a lot	Agree a little	Undecided	Disagree a lot	Disagree a little
1. learn at an outdoor school					
2. live and work with students from other schools					
3. make friends with students from other schools					
4. solve science problems					
5. learn about rocks and soils					
6. collect rocks and soils					
7. learn about animals that live in the forest					
8. learn about plants in the forest					
9. collect smaller animals from a stream					
10. learn about computers					
11. use computers					
12. be taught by different teachers					

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Nature-Computer Camp

Counselor Checklist

We are interested in the social behaviors of the campers. Certain of these behaviors are listed below. Please indicate by checking on the scale provided whether the behaviors were observed all the time, most of the time, part of the time or never. If you don't know, please indicate. Also state in the space provided other social behaviors worth noting.

Thank you for your cooperation.

Counselor _____ Camper _____

Session _____ Date _____

	All of the time	Most of the time	Part of the time	Never	Don't know
1. Follows camp rules and regulations					
2. Keeps camp facilities and grounds clean					
3. Uses camp equipment with care					
4. Remains within the boundaries of the camp at all times					
5. Practices safety rules on trails and at the campsite					
6. Stays away from unsupervised areas					
7. Participates in camp activities					
8. Reports to camp activities on time					
9. Completes assignments on time					
10. Follows instructions of camp personnel					
11. Is not verbally abusive					
12. Is not phyiscally abusive					
13. Is cooperative					
14. Maintains a good relationship with other campers					
15. Maintains a good relationships with teachers and counselors					
16. Other social behaviors (identify below and rate on the scale)					
(i) _____					
(ii) _____					
(iii) _____					

APPENDIX H

DATA SUMMARIES

Table 1

Table Showing the Means, Standard Deviations, T Value, Degrees of Freedom and Two-Tailed Probabilities for the Computer, Stream Ecology, Woodland Ecology and Geology Subtests of the NCC knowledge Test.

Variable		Number Of Cases	Mean	Standard Deviation	Standard Error	T Value	Degrees Of Freedom	2-Tail Prob.
Computers	Pretest	336	5.2798	1.828	0.100	7.48	335	0.000
	Posttest		6.3155	1.781	0.097			
Stream	Pretest	336	2.9792	1.256	0.069	9.13	335	0.000
	Posttest		3.8542	1.159	0.063			
Woodland	Pretest	336	3.2113	1.462	0.080	6.15	335	0.000
	Posttest		3.9196	1.509	0.082			
Geology	Pretest	336	1.5030	1.022	0.056	7.63	335	0.000
	Posttest		2.1577	1.237	0.067			
Environmental Science Total*	Pretest	336	7.6935	2.615	0.143	10.91	335	0.000
	Posttest		9.9315	2.846	0.155			

* Made up of stream, woodland and geology.

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Table 2

Nature Computer Camp Counselor Checklist

	All Of The Time		Most Of The Time		Part Of The Time		Never		Don't Know		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Follows camp rules and regulations	149	45	143	43	39	12	1	<1	0	-	332	100
Keeps camp facilities and grounds clean	223	70	91	27	8	2	0	-	0	-	332	99
Uses camp equipment with care	228	69	94	28	10	3	0	-	0	-	332	100
Remains within the boundaries of the camp at all times	251	76	72	22	9	3	0	-	0	-	332	101
Practices safety rules on trails and at the campsite	183	55	126	38	23	7	0	-	0	-	332	100
Stays away from unsupervised areas	206	62	104	31	22	7	0	-	0	-	332	100
Participates in camp activities	217	65	81	24	32	10	2	1	0	-	332	100
Reports to camp activities on time	198	60	100	30	33	10	1	<1	0	-	332	100
Completes assignments on time	184	55	83	25	8	2	0	-	57	17	332	99
Follows instructions of camp personnel	161	48	119	36	49	15	3	<1	0	-	332	99
Is not verbally abusive	166	50	107	32	50	15	9	3	0	-	332	100
Is not physically abusive	184	55	122	37	25	8	1	<1	0	-	332	100
Is cooperative	168	51	113	34	46	14	5	1	0	-	332	100
Maintains a good relationship with other campers	192	58	107	32	30	9	3	0	0	-	332	99
Maintains a good relationship with teachers and counselors	200	60	96	29	29	9	7	2	0	-	332	100
Total	2,920	59	1,558	31	413	8	32	1	57	1	4,980	100
Weighted Score	x 4		x 3		x 2		x 1					
	11,680		4,674		826		32				= 17,212	

17,212 4,923* = 3.5 4 = 88% (mean rating)

* Total (4,980) minus "Don't Knows" (57)

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